ASSET Series A (2007) 7 (1): 190-202

ASSET
An International Journal

TEMPORAL VARIATION OF RAINFALL EROSIVITY IN SOUTHERN NIGERIA

F. K. SALAKO

Department of Soil Science and Land Management
University of Agriculture, PMB 2240, Abeokuta, Nigeria
E-mail: kfsalako@yahoo.ie or kolawolesalako@hotmail.com

ABSTRACT

Rainfall amount and short-interval (e.g., ≤ 15 minutes) intensities are characteristics which distinguish tropical rains from temperate region rains in terms of erosivity. Therefore, the product of the two characteristics was used to evaluate trends in rainfall erosivity at Ibadan (a sub-humid zone) and Port-Harcourt (a humid zone), southern Nigeria using autographic rainfall charts that covered 1977 to 1999. The charts were analyzed at 15-minute intervals to obtain the maximum daily intensity, I_m. Thus, erosivity index was the product of daily rainfall amount (A) and I_m, and this is commonly referred to as the AI_m index. Descriptive statistics were used to characterize erosivity while trends were evaluated using standardized deviations. Mean annual AI_m was 684 $cm^2\ h^{-1}$ in Ibadan and 975 $cm^2\ h^{-1}$ in Port-Harcourt. Annual erosivity index was as high as 1374 $cm^2\ h^{-1}$ in Ibadan and 1491 $cm^2\ h^{-1}$ at Port-Harcourt. Although daily erosivity was statistically similar between the two locations, it was 1.86 times higher in April and 3.6 times higher in December at Ibadan than Port-Harcourt. Peak daily erosivity index was attained in March, April and November, suggesting the significant influence of convective storms. Daily erosivity index was close or lower than the long-term average in Ibadan but was higher than the average for Port-Harcourt. A lag period may occur between the two locations in attaining daily peak erosivity, but this can occur in the same year at both locations. Furthermore, the standardized deviations showed that between 1977 and 1988, rainfall erosivity exceeded the long-term average by as much as 2.59 deviation in Ibadan and 1.69 in Port-Harcourt but the trend between 1989 and 1999 showed a range of deviations from -1.72 to 0. Therefore, there was a decreasing trend in erosivity between 1977 and 1999. However, this was attributed to decreasing trend in rainfall amount, which did not translate to decreasing trend in soil erosion risks high rainfall intensities were considered. This was demonstrated by the fact that Ibadan which has about half the annual rainfall as Port-Harcourt had equal erosivity index values in some years due to bolstering of erosivity by high intensity rains.

Key words: Rainfall erosivity, Climate Change, Temporal variation, Southern Nigeria.